MUSCULOSKELETAL SYMPTOMS AMONG OPERATORS OF HEAVY MOBILE EQUIPMENT

N. Kumar Kittusamy
National Institute for Occupational Safety and Health, Spokane Research Laboratory,
Spokane, Washington, U.S.A.

The purpose of this study was to assess the adequacy of the cab design and to determine the percentage of musculoskeletal symptoms among operators of mobile equipment used in mining and construction. A questionnaire was designed to assess demographics, work information, job history, and musculoskeletal symptoms in operators of heavy mobile equipment. Information concerning equipment included design of the seat/chair, levers, pedals, bothersome vibration, quality of ingress/egress from the equipment, proper preventative maintenance and repairs, and age of the equipment. The body regions that were evaluated included the neck, middle/upper back, low-back, shoulder/upper-arm, elbow/forearm, wrist/hand, hip, knee, and ankle/foot. Five hundred and eighty six operators completed the questionnaire. The results indicate that these workers are at risk for developing musculoskeletal disorders, and the need to quantify risk factors (i.e., whole-body vibration and static sitting postures).

Introduction

Kittusamy and Buchholz[1] estimated that there are currently 540,000 operators of heavy mobile equipment, who are generally referred to as operating engineers, in the United States. Their estimate also shows that ninety percent of the operating engineers are involved in performing excavating and paving work, whereas the remaining 10% are crane operators and all of these operating engineers are exposed to whole body vibration. Two important risk factors for musculoskeletal disorders among operators of heavy earth-moving equipment are static sitting and whole body vibration,[2,3] where long term exposure to these risk factors have been associated with low back pain, disc degeneration, sciatic pain, and muscle fatigue.[4]

Methods

A work and health questionnaire was designed to assess demographics, work information, job history and musculoskeletal symptoms in operators of heavy mobile equipment. Self-administered work and health questionnaires were distributed to operating engineers by the International Union of Operating Engineers training centers in several states within the United States of America. The operators who attended their regularly scheduled training classes, from December 2001 to May 2005, at the training centers were requested to complete the questionnaire during their training session. The participation was voluntary, but participation was highly encouraged by the training officers. All of the participants were briefed about the purpose of the study and they signed an informed consent form.

Results

Five hundred and eighty six operators out 598 (98%) completed the questionnaire from 6 different local unions in 8 different states. A majority of the participants were male (91%). A majority of the operators (72%) were journey level. The ages of the operators ranged from 18 to 68 years. The majority of the operators (>65%) indicated that the cab (i.e., seat/chair, levers and pedals) was adequately designed for their job. Some of the operators reported that they were not bothered by vibration and that the quality of egress from the equipment was good. Most of the operators (>80%) indicated that proper maintenance and repairs were performed on their equipment. The classification of equipment as being old or new was almost identical.

The prevalence of musculoskeletal symptoms in the total population was 58.5%. Three body regions that received the highest total percent of symptoms categorized as somewhat severe or higher, included the knee, shoulder/upper-arm, and the low back.

Summary

The current study is in agreement with the prevalence of musculoskeletal symptoms in various body regions as reported by Zimmerman et al.[5] Also, similar results were observed in a pilot study of operators of heavy construction equipment that further reiterate the findings in the current study[6] .

Construction workers are often afflicted with musculoskeletal symptoms that compromise their health and well-being. However, there have been few formal studies of the nature and potentially preventable causes of these symptoms. The results from this study indicate that the operators are at risk for developing musculoskeletal disorders, the need to quantify risk factors (i.e., whole-body vibration and static sitting postures), and develop engineering controls to reduce the exposure levels.

References

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